‘Interstellar’ Ending & Space Travel Explained

Interstellar follows humanity’s last-ditch effort to find a new habitable planet – after Earth is ravaged by environmental catastrophe. When former NASA pilot-turned-corn farmer Cooper (Matthew McConaughey) finds the coordinates to a top secret government project, he’s brought in on the secret that the government has secretly been working to send a crew through a recently discovered wormhole in the hopes that humankind can find refuge in a new galaxy. However, in order to help save the remaining people on Earth, Cooper must leave his own family behind – and journey into unknown regions of space.

Like many Christopher Nolan films, *Insterstellar* presents a number of complicated story ideas that may be confusing for certain moviegoers – especially after a first viewing. For that reason, we’re here to help breakdown how space travel works in the movie, as well as explain *Interstellar*‘s ending. Our discussion is going to be full of **SPOILERS** for *Interstellar*, so **READ NO FURTHER unless you’re all caught up.** You have been warned.

MAJOR SPOILERS FOLLOW

Human Salvation (Plans A & B) Explained

Early on in the film we learn that the US government has secretly been funding a NASA project to find humankind a new home – since Earth is being ravaged by blight (and can no longer sustain agriculture). Cooper questions how NASA intends to find a planet capable of sustaining human life since humanity is already living on borrowed time, and transport to the nearest galaxy alone would take decades. Professor Brand (Michael Caine) then reveals that an unknown civilization, which he refers to as "They" (more on them later), have strategically created a wormhole near Saturn – a wormhole that can serve as a shortcut to a distant region of space.

As explained by Romilly (David Gyasi) in his impromptu paper hole example, our understanding of distance is based in three-dimensions – whereas theoretical physics suggests that space is a place of multi-dimensional interplay.

For that reason, the wormhole essentially functions as a bridge connecting two points in space by taking advantage of imperceptible fourth dimensional space. By the time that Cooper reunites with Prof. Brand, NASA has already sent thirteen humans through the wormhole – each one on a mission to determine whether nearby planets (on the other side of the wormhole) can sustain human life.

Upon arrival at their planet, each of the astronauts was to set up a beacon – indicating that their planet was a candidate for human colonization. NASA cannot communicate directly with the astronauts, but has been able to track their beacons for nearly a decade – of which only three remain active.

As a result, it is up to Cooper and the rest of the Endurance crew to uncover the fate of the other three astronauts – and collect any subsequent data that can be used to make an informed decision regarding which planet provides the best hope for humanity.

Should the Endurance team find a habitable planet, Brand claims that NASA has two plans for humanity's survival:

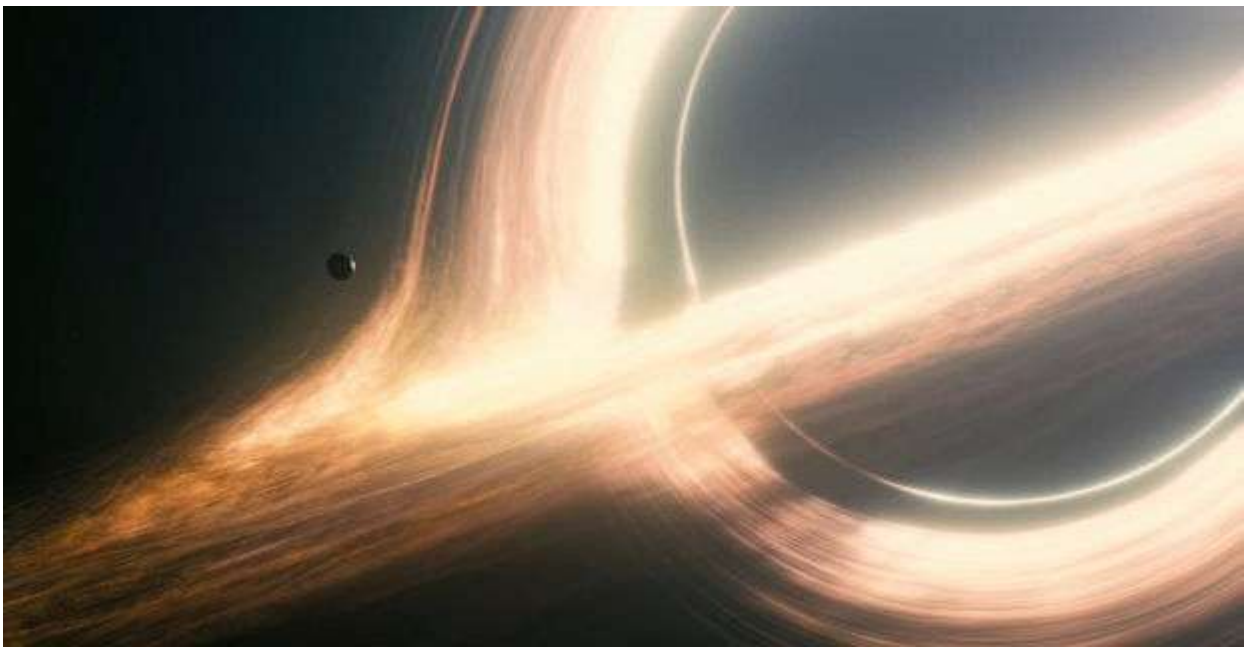
- Plan A) While the Endurance team is away, Brand will continue to work on an advanced equation that, if solved, will allow humans to harness fifth-dimensional physics – specifically gravity. Should Brand succeed, NASA will be able to defy our traditional understanding of physics and launch an enormous space station (carrying the remainder of Earth's surviving population) into space. The very facility that Cooper and Murph stumble upon at the beginning of the film isn't just a NASA research station – it's a construction site for humankind's space-traveling ark.
- Plan B) Should Brand fail in his calculation and/or the Endurance take too much time investigating potential homeworlds, NASA has harvested a bank of fertilized human embryos that can be used to ensure humanity's survival – after everyone on Earth is wiped out. To ensure genetic diversity, NASA procured DNA from a wide range of sources – so that future generations would not be limited to reproduction between Endurance crew members. In this scenario, the Endurance team would settle down on the most habitable planet and raise the first generation of embryos – with each subsequent generation helping to raise a new set of embryos (as well as reproduce naturally).

Later we learn that Professor Brand never believed that Plan A was possible – stating that he solved the equation years back, but it would not save them. He only championed the idea in order to rally Earth leaders into working together – and building the necessary infrastructure to ensure that, unknown to anyone but him, Plan B would be a success. Brand reasoned that people would not have cooperated just to save humanity – they needed to believe that working together could lead to their own personal salvation.

Upon learning that Plan A was a farce, Cooper and Amelia Brand (Anne Hathaway) commit to Plan B on their third (and final) planetary option – where Amelia's astronaut lover, Wolf Edmonds, was still reporting a positive beacon. Yet, Cooper remains unconvinced that Plan A is impossible and, as they use a nearby black hole (dubbed Gargantua) to slingshot Endurance toward Edmonds' planet, Cooper sends TARS (the crew's robot helper) into the center of the black hole – in the hopes that it can translate data that might help NASA refine any missteps in Professor Brand's calculations.

Cooper also sacrifices himself to reduce weight on the Endurance, ensuring that Amelia can make it to Edmonds' planet and enact Plan B should TARS fail. However, instead of dying alone in space, Cooper is pulled inside The Tesseract – the gravitational singularity that is maintaining the wormhole – created by the aforementioned "They".

But who are these beings (the "They) that gave humanity a helping hand?



“They” Explained

Cooper and the other NASA scientists assume “They” are an advanced extraterrestrial (or supernatural) race who have unlocked the mysteries of dimensional manipulation – and, for some unknown reason, decided to aid mankind in escaping our doomed planet. The NASA team believes that the beings may be unable (or unwilling) to communicate directly with humans – specifically that “They” are fifth-dimensional, having transcended our three-dimensional ways of understanding the universe. Brand thinks “They” have laid out a series of rudimentary breadcrumbs (binary messages) and advanced technology (the wormhole) for humans to follow – in order to save ourselves from annihilation.

However, as revealed in *Interstellar*‘s final act, what NASA postulated was a single alien race is actually two separate but related entities:

- Future humans who have mastered the laws of our universe – allowing them to manipulate time and space.
- Cooper attempting to communicate with his daughter inside the “Tesseract” – which was built for him by the future humans.

As a result, most of the unexplained phenomena that NASA attributes to the beings are actually actions that Cooper takes in the future (as we follow him through the film). When Cooper sacrifices himself to ensure Plan B, he is caught in the black hole’s gravitational pull but, instead of dying, ejects from his ship – landing, as previously mentioned, inside The Tesseract (aka the wormhole’s gravitational singularity). A place where the laws of space and time become infinite.

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Knowing their own past – specifically the events that led to their salvation (and exodus from Earth) – it was in fact humans who built the Tesseract at some point far in the future and then, using their advanced knowledge of fifth-dimensional physics, manipulated spacetime to place the machine into the past (where NASA finds it orbiting Saturn).

Since Cooper and Murph are remembered as the saviors of humanity, the fifth-dimensional humans – who can observe past, present, and future – custom-build The Tesseract for Cooper, so that he can communicate with his daughter in the past and relay the data that TARS (the quadrilateral shaped robot) had collected inside the singularity.

To that end, the Tesseract is a filter that translates the fifth dimension into three-dimensional visibility (tuned to Murph's room) – allowing Cooper to visit his daughter at any point in time (and "shake" Amelia's hand during the initial launch).

No doubt, time-travel die-hards will debate whether the plot results in an unexplained paradox (how did future humans *first* survive to make a Tesseract – given that there would have been no Tesseract to save them) but Nolan leaves that particular detail up for post-viewing debate.

But how can a future humans manipulate space time? And how does Cooper plan to time-travel back to Amelia at the end of the film?

Time/Space Relativity Explained

Interstellar is based on the ideas of theoretical physicist Kip Thorne – specifically the notion that while we observe the universe in three dimensions, there could be at least five dimensions. In certain theories, it is posited that certain forces (in this case gravity) bleed through dimensions – meaning that, based on Newton's Laws, what we perceive as a finite calculation could actually have infinite implications.

The concept is outright exemplified in the first planet that the Endurance team visits. In general, time on our side of the wormhole moves faster than time in the uncharted side. Due to close proximity with gravitational anomalies from a nearby black hole (Gargantua), time on the other side is exponentially slower – relative to the distance between an object and the black hole's gravitational pull. As a result, time on Miller's planet moves significantly slower: for every hour that the team spends on the water planet, seven years pass back home – a primary reason that Cooper is motivated to get off the planet as soon as possible (even before they realize it's a death trap). Cooper knows that three hours on planet's surface will cost him decades of time with his family.

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As Amelia suggests, the effect of gravity from the black hole on time was to blame for the Endurance team's unfortunate visit to Miller's planet in the first place – since what they perceived as years of positive beacon readings were actually mere minutes for Miller (who was killed by a wave moments after she landed).

The concept is further hammered home when, following the mission, Amelia and Cooper reunite with Romilly, who stayed behind on the Endurance to gather data (far from Gargantua) – and, in the three hours his team was gone, has lived twenty-three full years alone without them. Similarly, the crew receives video messages from back home and we see that Cooper's children, Tom and Murph have also aged – now full grown adults (played by Casey Affleck and Jessica Chastain, respectively).

As the team moves farther from the black hole, the disproportion in spacetime reduces – meaning that when they arrive at Mann's planet, there's significantly less urgency (though the once brave astronaut has been twisted by his longer stretch of time alone).

A tangible effect of gravity on spacetime is also responsible for Cooper's ability to communicate with young Murph when inside the Tesseract. Inside the machine, gravity bleeds through to other dimensions in time and space, allowing Cooper to spell out a message ("S-T-A-Y") by pushing books off of Murph's shelf – or

communicate map coordinates to the past version of himself by spreading dust across the floor (in binary language). Most importantly, the fifth-dimensional communication through gravity (made visible by three-dimensional objects back on Earth) enables Cooper to gently manipulate the hands on Murph's watch – transferring the data that TARS acquired with morse coded watch ticks. Subsequently, translating that coded data gives Murph all the information she needs to drastically advance humanity's understanding of space and time – as well as complete Plan A.

As for how Cooper survives his time inside the Tesseract, and how he intends to reunite with Amelia? Nolan simply reapplies the same theory that has been present the entire film. Given that time moves slower near the gravity pull of the black hole, Cooper's ejection from the Tesseract is only seconds for him, but over half a century for the rest of humanity. Keep in mind, if the ratio of time on Miller's planet was 1 hour for every 7 years on Earth, the proportion would be skewed exponentially at the absolute center of the Tesseract singularity. As a result, while it appears to Earthbound humans that TARS and Cooper have been floating out in space for nearly ninety years, they were actually only out there for mere seconds as they perceived it.

The disproportionate relativity allows Cooper to survive and reunite with Murph – who, living on the faster moving side of the wormhole, is now over one-hundred years old. Knowing that Cooper has nothing left to live for in a post-Earth existence (since his son Tom is presumed dead and Murph will soon join him), Murph reminds her father that, through the wormhole, Amelia is just beginning to set-up Plan B on Edmonds' planet. At the same time, it is revealed that even though Edmonds' planet is actually habitable, the astronaut himself did not survive the landing – leaving Amelia alone at the colonization site.

Using a reversal of the film's primary relativity theory, Cooper hops into a ship, with the knowledge that even though nearly one hundred years have passed since the Endurance first set out, time on the other side of the wormhole is moving much slower – meaning that a second trip should allow him to reunite with Amelia on Edmonds' planet only a short time after Cooper first sacrificed himself and dropped into the singularity. We don't actually see the reunion, so Cooper's actual fate is left up to some interpretation, but there's reason to be optimistic that he reaches Amelia and helps ready the colony for humankind.

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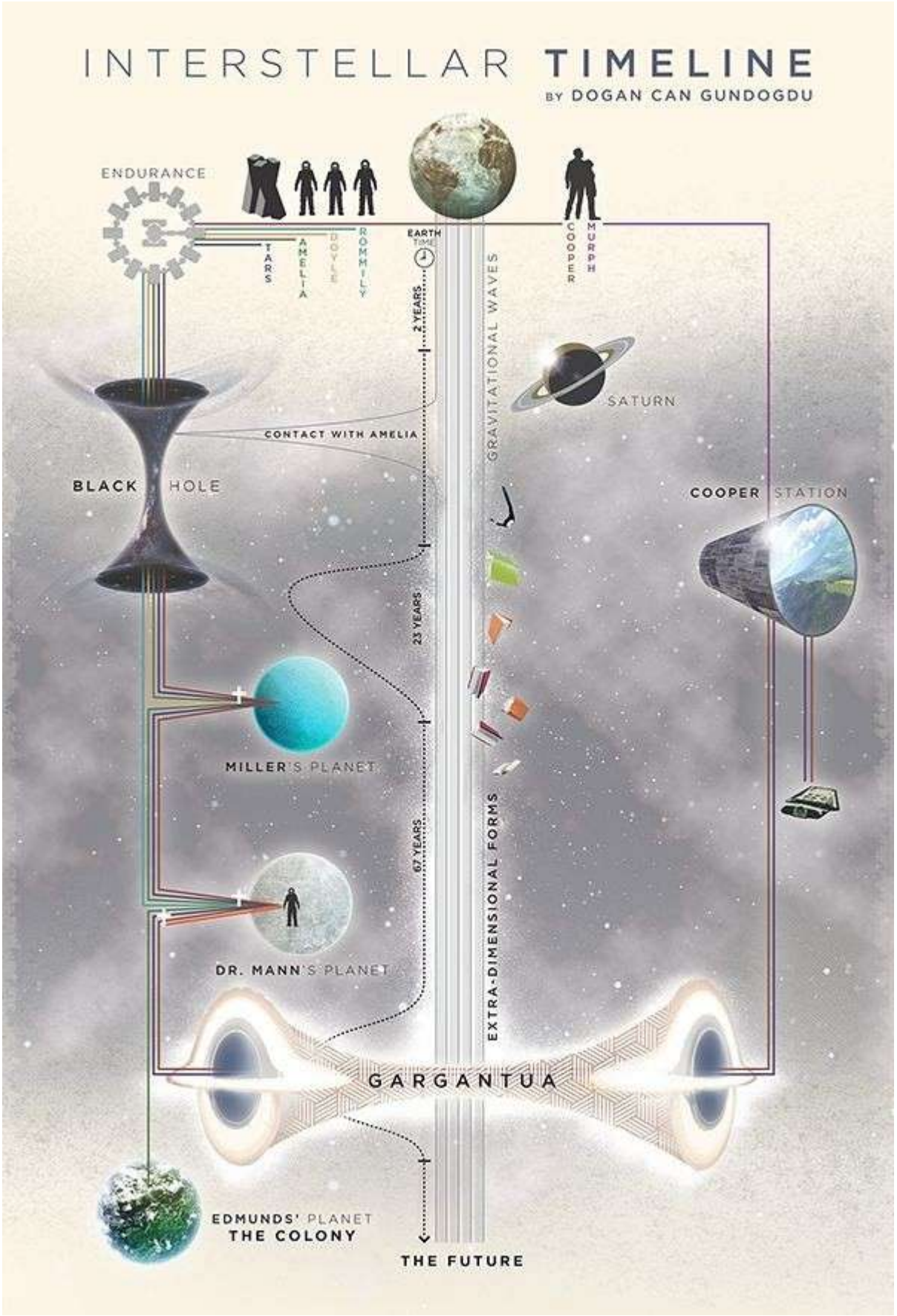
Conclusion

Interstellar is a film about shoving-off into the unknown. Much like Nolan's mind-bending sci-fi drama *Inception* (read our explanation of that ending), the main takeaway from the end of *Interstellar* is not that Cooper and Amelia will be reunited (though it's possible that they will).

Rather the ending, and Cooper's departure to find Amelia illustrates what Prof. Brand regularly suggested by way of poet Dylan Thomas:"*Do not go gentle into that good night, old age should burn and rage at close of day. Rage, rage against the dying of the light."* The movie seems to posit that humanity is at our best when we throw ourselves passionately into the unknown – in search of love and discovery.

…And that's exactly what Coop intendeds to do.

UPDATE: Here's a chart that explains what happened in visual terms (CLICK TO SEE FULL SIZED VERSION):



SEE ALSO: *Interstellar* Review

Interstellar runs 169 minutes and is Rated PG-13 for some intense perilous action and brief strong language. Now playing in IMAX theaters with a full release Friday, November 7th.

Have your own theory? Feel free to share it